

**Notice of Allowability**

Application No.

10/709,545

Applicant(s)

SAMII ET AL.

Examiner

Tracy Dove

Art Unit

1745

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 4/19/05.
2. ☒ The allowed claim(s) is/are 26-29, 31, 32 and 37-40.
3. ☒ The drawings filed on 12 May 2004 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
  1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |   |   |
|---|---|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892)  | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)           |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                | 6. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____ |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),<br>Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment                   |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material          | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance  |
|   | 9. <input type="checkbox"/> Other _____   |

### EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mark White on 4/29/05.

The application has been amended as follows:

Cancel withdrawn claims 10-25, 33, 34 and 36.

Amend claims 27 and 37-40 as follows:

27. (Currently Amended) The battery separator in accordance with claims 37, 38, 39 or 40, and further having a shutdown temperature of about 138°C.

37. (Currently Amended) A battery separator comprising a microporous membrane having a thickness of 5 to 175  $\mu\text{m}$ , and a porosity of between 30% and 95%, said microporous membrane comprised of between 85% to 95% by weight of an UHMW polyethylene having a minimum average molecular weight of  $1 \times 10^6$ , and between 5% and 15% by weight of a  $\text{TiO}_2$  particulate filler with an average particle size diameter of between 0.001  $\mu\text{m}$  and 1  $\mu\text{m}$ .

38. (Currently Amended) A battery separator comprising a microporous membrane having a thickness of 5 to 175  $\mu\text{m}$ , and a porosity of between 30% and 95%, said microporous membrane consisting of between 85% to 95% by weight of an UHMW polyethylene having a minimum average molecular weight of  $1 \times 10^6$ , and between 5% and 15% by weight of a  $\text{TiO}_2$  particulate filler with an average particle size diameter of between 0.001  $\mu\text{m}$  and 1  $\mu\text{m}$ .

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39. (Currently Amended) The battery separator in accordance with claim 37, having an air permeability of between 1sec/10cc and 100 sec/10cc.

40. (Currently Amended) The battery separator in accordance with claim 38, having an air permeability of between 1sec/10cc and 100 sec/10cc.

The following is an examiner's statement of reasons for allowance: the claims are directed toward a battery separator comprising a microporous membrane having a thickness of 5 to 175  $\mu\text{m}$ , and a porosity of between 30% and 95%, said microporous membrane comprised of between 85% to 95% by weight of an UHMW polyethylene having a minimum average molecular weight of  $1 \times 10^6$ , and between 5% and 15% by weight of a  $\text{TiO}_2$  particulate filler with an average particle size diameter of between 0.001  $\mu\text{m}$  and 1  $\mu\text{m}$ .

The prior art does not teach or suggest the claimed microporous membrane. Sogo teaches a separator for a battery comprising a microporous film including a matrix comprised of a polyethylene and a polypropylene polymer. The membrane is produced by blending the matrix polymer with inorganic particles, such as titanium oxide. The separator comprises 10-60 wt% of the matrix polymer and 10-50 wt% of the inorganic particles (6:63-7:10). After processing, the membrane may contain 3% by weight or less of the inorganic particles based on the weight of the microporous film (8:36-39). However, Sogo does not teach the claimed percentage range of UHMW polyethylene or the claimed percentage range of the  $\text{TiO}_2$  filler.

Samii teaches a microporous membrane battery separator for a battery comprising a titanium dioxide ( $\text{TiO}_2$ ) filler and a polyolefin. Example 1 teaches the membrane may have a porosity of 50% and consists of approximately 5% UHMW polyethylene and 95%  $\text{TiO}_2$ .

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Example 2 teaches a blend of 5 parts of ultra fine titanium dioxide (particulate filler of presently claimed invention) and 95 parts of pigment grade titanium dioxide was prepared. The resulting microporous membrane consists approximately of 5% polymer and 95% filler. Samii does not teach or suggest the claimed percentage ranges for the UHMW polyethylene and TiO<sub>2</sub> filler.


Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is 571-272-1285. The examiner can normally be reached on Monday-Thursday (9:00-7:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

April 29, 2005

  
**TRACY DOVE**  
**PRIMARY EXAMINER**